Remarks

35 USC § 103 (a)

The examiner has rejected claims 1, 3, 8-15, and 17 as being unpatentable under 35 USC § 103(a) over Haltiner el al. (US 2003/0235746A1) in view of Thomas et at. (US 2005/0074659) and Pondo (US 6,017,649).

The examiner begins her discussion of the claims by referencing the limitation of a support bump. The applicant's previous amendment removed this limitation, thus the examiner's discussion of the same appears to be an oversight.

The examiner then discusses claims 1 and 13. Claims 1 and 13, and all remaining claims by virtue of dependency, recite that the stamped separator plate has an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in a downward direction.

These limitations readily distinguish the present invention from the art of record. Haltiner el al. (US 2003/0235746A1) shows a series of flat plates which, when laid on top of one and another, form the various pathways for the gasses to travel. See figures 1,2,3,4,5,6,7,8,9, and 10. Haltiner does not remotely teach that the stamped separator plate has an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in a downward direction. Quite the contrary, Haltiner in fact teaches that it is advantage of the Haltiner system that all the parts are flat. In the abstract, Haltiner makes this plain where he states:

> A fuel cell module having four sheet metal parts stamped from flat stock. The parts do not require any forming operations such as folding or dishing. Each part may have a different thickness to suit its function. The first part is a cell mounting frame for receiving and supporting a PEN fuel cell element. The second part is a cathode spacer, the thickness of the spacer determining the height of the cathode air flow field. The third part is an anode spacer, the thickness of spacer determining the height of the anode fuel flow field. The fourth part is a separator plate for separating the anode gas flow in one cell from the cathode air flow in an adjacent cell in a fuel cell stack. The four plates are joined by welding or brazing and may be assembled in any order or combination which suits the assembly process. Any desired number of modules may be stacked together to form a fuel cell stack.

Accordingly, Haltiner teaches directly away from the claimed feature of the stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame having an outer edge and at least one hydrogen manifold collar displaced in a downward direction.

Thomas et al. (US 2005/0074659) relies on a housing to contain the gasses, and thus fails to disclose the features that the stamped separator plate has an outer edge displaced in an upward direction and the stamped frame has an outer edge displaced in a downward direction. As with Haltiner, Thomas et al describe this distinction as an advantage. At paragraph 11, Thomas states:

[0011] Provision of fuel inlet and exhaust manifolds internally of the plates and oxygen-containing gas (usually air) inlet and exhaust manifolds externally of the plates can optimize the structure of the plates from both economic and power producing perspectives. If the manifolds were fully internalized, the construction of the plates would be more complex and a significant portion of the plates would need to be dedicated to the formation of the respective manifolds, i.e. each plate would have an increased aperture area compared to the plates in the stack of the invention. Relatively increasing the functional area of the plates allows for maximized generation of electric current from the stack. Externalizing the air manifolds simplifies the inter-plate sealing since there are no air apertures through the plates around which individual seals must be provided, and providing the air manifolds between the plates and the housing can allow for simple seals between the air manifolds. However, internalizing the fuel manifolds also means the overall structure may be robust since external connections that may otherwise be subject to fatigue or leakage are minimized.

As with Haltiner, Thomas thus teaches directly away from the claimed features of the stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction, describing arrangements whereby the manifolds are internal as disadvantageous. It is important to note that Thomas teaches that internal manifolds and internalized air flow are disadvantageous generally, without considering the arrangement and claimed features of

the present invention. Accordingly, it is apparent by Thomas' general deprecation of the possibility that such an arrangement would prove advantageous that Thomas did not contemplate the specific arrangement shown and claimed in the present invention, nor did Thomas realize that such an arrangement overcomes the disadvantages that Thomas identified.

The examiner concedes that neither Haltiner el al. (US 2003/0235746A1) nor Thomas et at. (US 2005/0074659) show the stamped separator plate and frame with displaced outer edges. However, the examiner argues that Pondo (US 6,017,649) provides this teaching. Specifically, the examiner argues that Pondo teaches that "the upward and downward bends of the plates makes for a better seal in the manifolds, as well as better integrity of the plates."

However, Pondo's design is fundamentally the same as Haltiner in that Pondo also relies on a stack of flat parts to form the manifold collar. Pondo shows this in Figure 4, and he describes it explicitly at column 6, lines 58-64 where Pondo states:

> When the cell components are stacked, the aligned perforations in separator plate 10, first matrix layer 14, first carbonate layer 15, second matrix layer 16, second carbonate layer 17, and third matrix layer 18 form internal gas manifolds for transport of reactant gases to and from the anode and cathode facing faces of separator plate 10.

Accordingly, Pondo does NOT show the formation of the manifold collar by displacing the separator plate in an upward direction, and the frame in a downward

direction, as is required in the limitations of Claims 1 and 13, and all remaining claims by virtue of dependency. Instead, just as is the case with Haltiner, Pondo relies on stacking flat sections and aligning their perforations to form manifolds. Pondo states this explicitly, and shows it in Pondo's figures. Thus, even if the examiner is correct, and Pondo can be read to teach that the separator plate can be stamped to form upward and downward bends that make for a better seal, Pondo *still* fails to disclose the features that the stamped separator plate has at least one oxygen manifold collar displaced in an upward direction and the stamped frame has at least one hydrogen manifold collar displaced in a downward direction.

Accordingly, the combination of Haltiner el al. (US 2003/0235746A1), Thomas et at. (US 2005/0074659) and Pondo (US 6,017,649) never show the feature of a stamped separator plate having at least one oxygen manifold collar displaced in an upward direction and the stamped frame having at least one hydrogen manifold collar displaced in a downward direction. The failure of the prior art to show or suggest these limitations, combined with the fact that Haltiner el al. (US 2003/0235746A1), Thomas et at. (US 2005/0074659) actually teach directly away from these limitations, insures that the claims are readily distinguished from these references, and these references fail to set forth a prima facie case of obviousness.

The examiner then rejects claims 2 and 16 as being unpatentable over Haltiner el al. (US 2003/0235746A1), Thomas et at. (US 2005/0074659) in view of Pondo (US 6,017,649) as discussed above, and further in view of Carolan et al (US Pat. No. 5,750,279).

However, Carolan et al (US Pat. No. 5,750,279) does not remotely provide any teaching that would remedy the deficiencies of Haltiner el al. (US 2003/0235746A1), Thomas et at. (US 2005/0074659) and Pondo (US 6,017,649). Carolan et al (US Pat. No. 5,750,279) does not teach stamping either the separator plate or the frame at all. Instead, Carolan shows a complex arrangement of machined parts (See figs 11, 12 and 13) including separate tubular cells 84, end caps 82, and hollow conduit 86, all of which are missing from the present invention, and readily distinguished from the claimed features of a stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction. Accordingly, Carolan does not remotely teach these limitations of the claims as presented.

The examiner then rejects claims 4-7 and 18-21 as being unpatentable over Haltiner el al. (US 2003/0235746A1) in view of Thomas et at. (US 2005/0074659) in view of Pondo (US 6,017,649) as discussed above, and further in view of James et al. (US Pat. No. 5,766,789 A).

However, James et al. (US Pat. No. 5,766,789 A) does not remotely teach stamping, as James fails to describe the housing altogether. Accordingly, James does not discuss either the separator plate or the frame at all, much less the method of forming the manifold collar. Instead, James simply describes fuel cells as having "passageways" for fuel and oxidant generally, without showing any arrangement or assembly to provide these passageways. At column 4, lines 5-24 James states:

A fuel cell is an apparatus for continually producing electric current by electrochemical reaction of a fuel with an oxidizing agent. More specifically, a fuel cell is a galvanic energy conversion device that chemically converts a fuel such as hydrogen or a hydrocarbon and an oxidant that catalytically react at electrodes to produce a DC electrical output. In one type of fuel cell, the cathode material defines passageways for the oxidant and the anode material defines passageways for fuel. An electrolyte separates the cathode material from the anode material. The fuel and oxidant, typically as gases, are continuously passed through the cell passageways for reaction. The essential difference between a fuel cell and a battery is that there is a continuous supply of fuel and oxidant from outside the fuel cell. Fuel cells produce voltage outputs that are less than ideal and decrease with increasing load (current density). Such decreased output is in part due to the ohmic losses within the fuel cell, including electronic impedances through the electrodes, contacts and current collectors. A need therefore exists for fuel cells that have reduced ohmic losses. The graphite current collectors used in phosphoric acid and solid polymer electrolyte fuel cells, to the cathode metal oxides such as, praseodymium oxide, indium oxide used in solid oxide fuel cells and to the nickel oxide cathode used in molten carbonate fuel cells are examples of a need for conductive additives. See generally, "Handbook of Batteries and Fuel Cells", Edited by Linden

Accordingly, James is missing all of the limitations set forth in the present invention, and is readily distinguished from the claimed features of a stamped separator

plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction. Accordingly, James does not remotely teach these limitations of the claims as presented.

According to the USPTO guidelines setting forth examination procedures in light of *KSR Int'l Co. v. Teleflex Inc.,* 127 S.Ct. 1727 (2007), (hereafter the "guidelines") "any obviousness rejection should include, either explicitly or implicitly in view of the prior art applied, an indication of the level of ordinary skill. A finding as to the level of ordinary skill may be used as a partial basis for a resolution of the issue of obviousness." As is plain from the references, those of ordinary skill in the art explicitly taught away from the applicant's approach to fabricating a cassette for a solid oxide fuel cell (SOFC) stack having the claimed features of a stamped separator plate having an outer edge and at least one oxygen manifold collar displaced in an upward direction and the stamped frame has an outer edge and at least one hydrogen manifold collar displaced in an downward direction. Accordingly, the Patent and Trademark Office cannot show that the level of ordinary skill did not contemplate the present invention as claimed.

Conclusion

Applicant has made an earnest attempt to place the above referenced application in condition for allowance and action toward that end is respectfully requested. Should the Examiner have any further observations or comments, she is invited to contact the undersigned for resolution.

Respectfully submitted,

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The undersigned hereby certifies that the forgoing Amendment dated March 26, 2009 in responsive to the office action of December 26, 2008 together with a fee sheet (PTO form SB/22) and a return postcard are being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on the date set forth below.

Douglas E. McKinley, Jr.
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3/26/2008
Date